



The R-fMRI Maps Project

Chao-Gan YAN, Ph.D.

严超轶

ygc.yan@gmail.com

<http://rfmri.org>

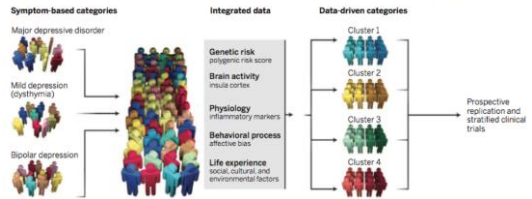
Institute of Psychology, Chinese Academy of Sciences

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The R-fMRI Maps Project

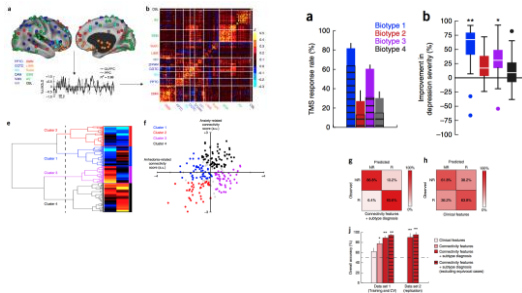
Deconstructed, parsed, and diagnosed.

A hypothetical example illustrates how precision medicine might deconstruct traditional symptom-based categories. Patients with a range of mood disorders are studied across several analytical platforms to parse current heterogeneous syndromes into homogenous clusters.



Insel and Cuthbert 2015, Science

Biotypes in Depression



Drysdale et al., 2016, Nat Med

The R-fMRI Maps Project



The R-fMRI Maps Project



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The R-fMRI Maps Project

已共享4770名被试数据，包括：

1. Amplitude of low frequency fluctuations (ALFF)
2. Fractional ALFF (fALFF)
3. Regional Homogeneity (ReHo)
4. Voxel-mirrored homotopic connectivity (VMHC)
5. Degree Centrality (DC)
6. 功能连接矩阵
 - a. Automated Anatomical Labeling (AAL) atlas
 - b. Harvard-Oxford atlas
 - c. Craddock's clustering 200 ROIs
 - d. Zalesky's random parcellations
 - e. Dosenbach's 160 functional ROIs

此外，也共享灰质(GM)、白质(WM)和脑脊液(CSF)密度与体积图像。

Table 1: R-fMRI Maps Project Data Availability

Year	IP Address	City	Country
May 24, 2015 10:00:00	192.168.1.1	Beijing	China
May 24, 2015 10:00:00	192.168.1.2	Beijing	China
May 24, 2015 10:00:00	192.168.1.3	Beijing	China
May 24, 2015 10:00:00	192.168.1.4	Beijing	China
May 24, 2015 10:00:00	192.168.1.5	Beijing	China
May 24, 2015 10:00:00	192.168.1.6	Beijing	China
May 24, 2015 10:00:00	192.168.1.7	Beijing	China
May 24, 2015 10:00:00	192.168.1.8	Beijing	China
May 24, 2015 10:00:00	192.168.1.9	Beijing	China
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May 24, 2015 10:00:00	192.168.1.11	Beijing	China
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May 24, 2015 10:00:00	192.168.1.18	Beijing	China
May 24, 2015 10:00:00	192.168.1.19	Beijing	China
May 24, 2015 10:00:00	192.168.1.20	Beijing	China
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May 24, 2015 10:00:00	192.168.1.23	Beijing	China
May 24, 2015 10:00:00	192.168.1.24	Beijing	China
May 24, 2015 10:00:00	192.168.1.25	Beijing	China
May 24, 2015 10:00:00	192.168.1.26	Beijing	China
May 24, 2015 10:00:00	192.168.1.27	Beijing	China
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Outline

- ➡ Data Preparation
- Standardized Preprocessing
- Quality Control
- Data Upload

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Data Organization

ProcessingDemoData.zip

FunRaw

Sub_001
Sub_002
Sub_003

Functional DICOM data

T1Raw

Sub_001
Sub_002
Sub_003

Structural DICOM data

<http://rfmri.org/DemoData>

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Data Organization

ProcessingDemoData.zip

FunImg

Sub_001
Sub_002
Sub_003

Functional NifTI data
(.nii.gz, .nii or
.img)

T1Img

Sub_001
Sub_002
Sub_003

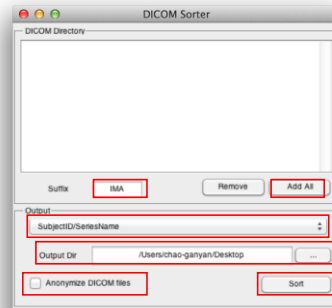
Structural NifTI data
(.nii.gz, .nii or
.img)

8



9

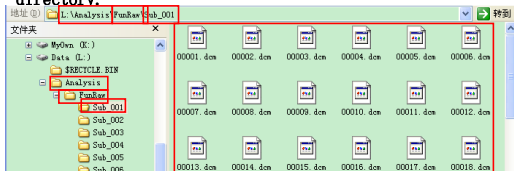
IMA
dcm
none



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Data preparation

Arrange each subject's fMRI DICOM images in one directory, and then put them in "FunRaw" directory under the working directory.

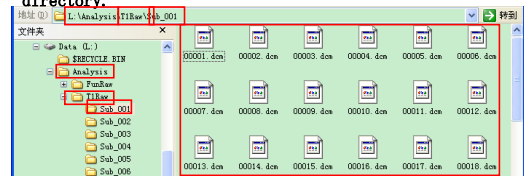


Subjects' DICOM files directory, please name as this Working directory

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Data preparation

Arrange each subject's T1 DICOM images in one directory, and then put them in "T1Raw" directory under the working directory.



Subjects' DICOM files directory, please name as this Working directory

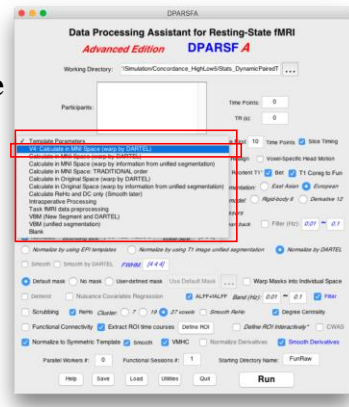
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Outline

- Data Preparation
- ➔ • Standardized Preprocessing
- Quality Control
- Data Upload

Resting State fMRI Data Processing

Template Parameters



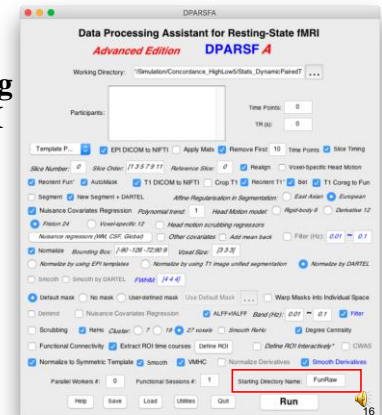
14

Preprocessing and R-fMRI measures Calculation



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Preprocessing and R-fMRI measures Calculation



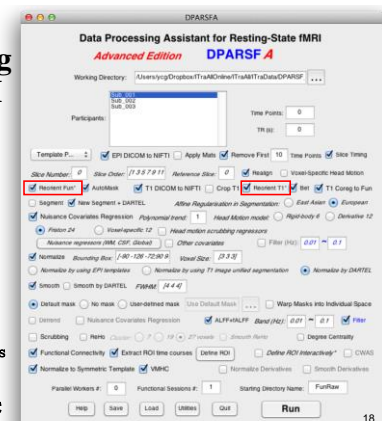
16

Outline

- Data Preparation
- Standardized Preprocessing
- ➔ • Quality Control
- Data Upload

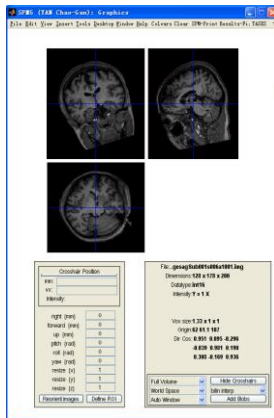
Preprocessing and R-fMRI measures Calculation

Reorient Interactively
This step could improve the accuracy in coregistration, segmentation and normalization, especially when images had a bad initial orientation.
Also can take as a QC step



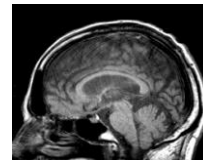
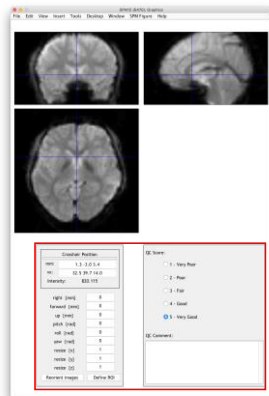
18

17

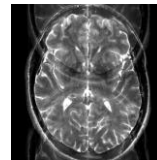


Display the mean image after realignment. (Could take this step as a QC procedure.)

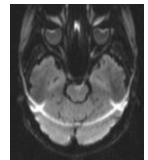
QC scores and comments
are stored at
{WorkDir}/QC



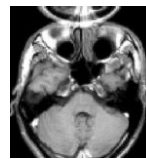
Motion artifact



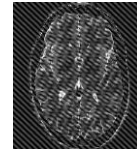
Ghost



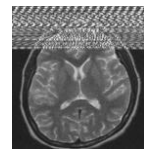
Chemical shift artifacts



Aliasing artifacts

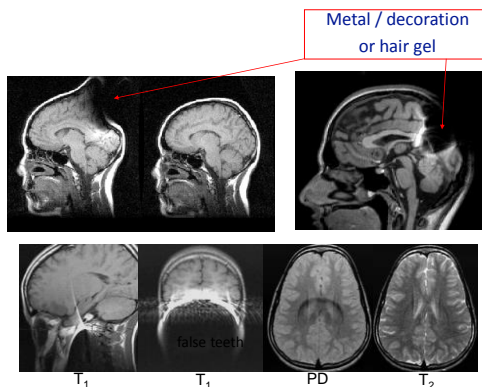


Spikes (single peak in k-space)



Zipper

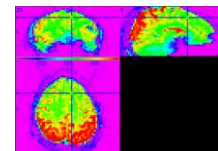
Courtesy of Dr. Rui-Wang Huang



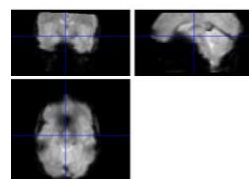
Courtesy of Dr. Rui-Wang Huang



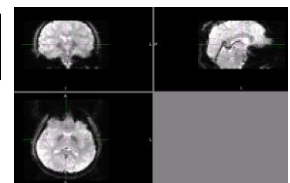
Ghost



Inhomogeneity



Bad coverage

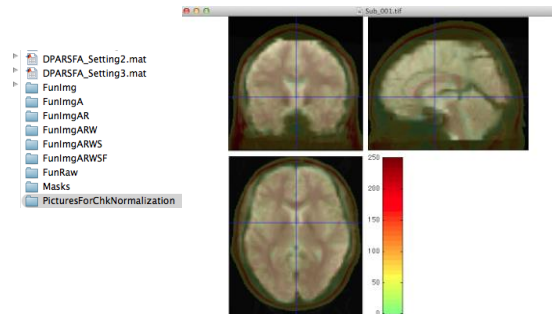


Not good coverage

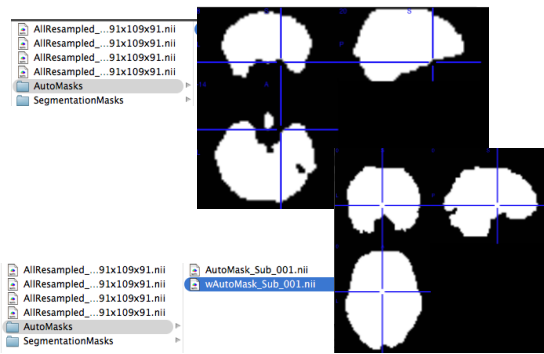
Quality Control

	A	B	C	D
1	Subject ID	QC Score	QC Comment	
2	Sub_001		5 Very Good!	
3				

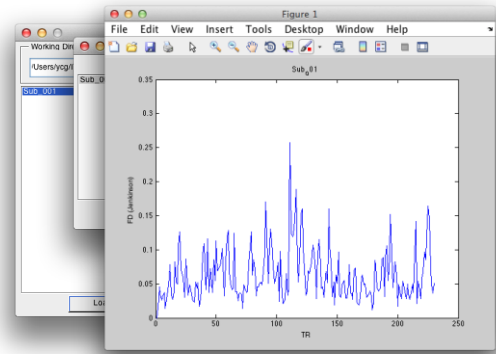
Quality Control



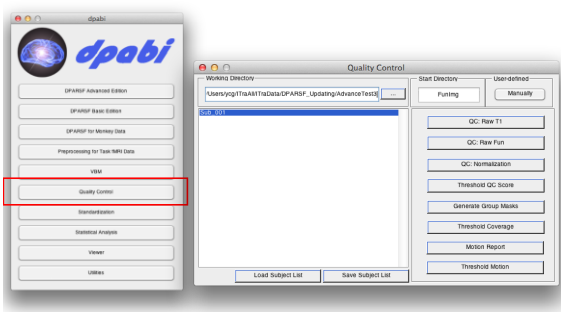
Quality Control



Quality Control



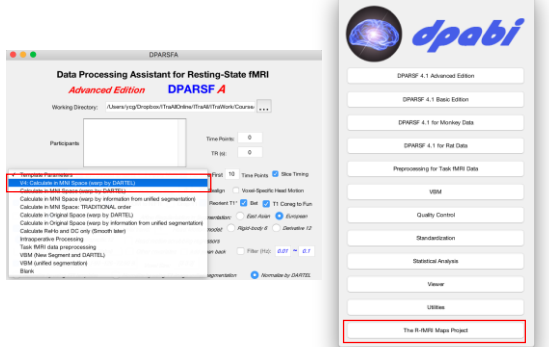
Quality Control



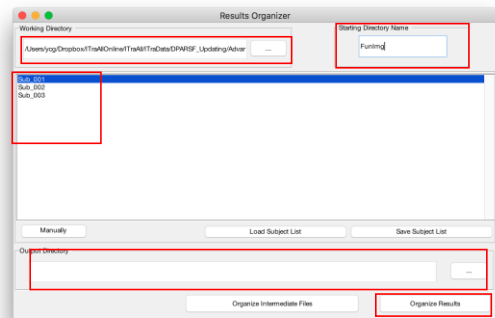
Outline

- Data Preparation
- Standardized Preprocessing
- Quality Control
- ➔ • Data Upload

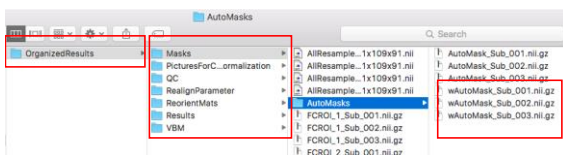
Data Upload



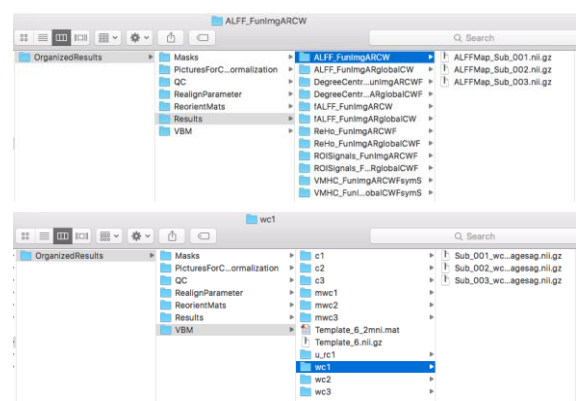
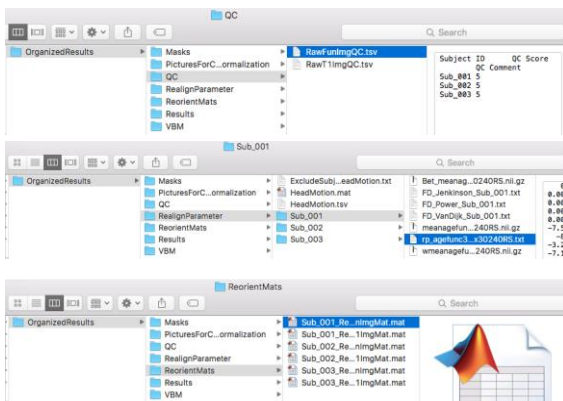
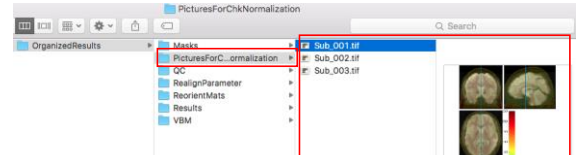
Data Upload



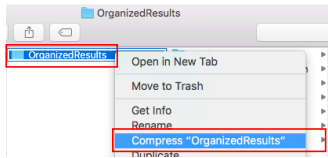
Organized Results



Organized Results



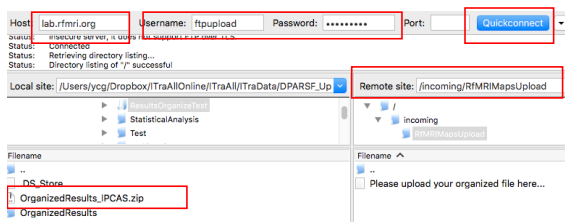
Data Upload



Data Upload

1. FTP: lab.rfmri.org; username: ftpupload; password: FTPUpload. E.g., FileZilla

Data Upload



Data Upload

1. FTP: lab.rfmri.org; username: ftpupload; password: FTPUpload. E.g., FileZilla
2. 网盘
3. QQ邮箱超大附件

Send an email to rfmrilab@gmail.com to let us know, together with the phenotypic table.

Thanks for your attention!